

### **REMARKS/ARGUMENTS**

Claims 20, 24, 35, 37, 50, 51 and 53-55 are currently pending in this application. No claims have been added with the filing of this response. Reconsideration of the application is requested in view of the following remarks.

#### **Rejection under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph**

The rejection of claims 20, 24, 35, 50 and 51 under 35 U.S.C. § 112, second paragraph is respectfully traversed.

The Office asserts that it is not clear as to what “percentage” refers to. However, Applicants point out that the term “percentage” and the percentages recited refer to their ordinary meaning, as would be understood by one having ordinary skill in the art in light of the present specification. In particular, the term “percentage” or “%” is quantitative measurement that generally refers to the *amount* of nanoparticles in the film. The ranges recited in the claims refer to the limit of the amount of nanoparticles. Therefore, the language recited in the present claims is clear and not indefinite.

Accordingly, Applicants respectfully request that the rejections of claims 20, 24, 35, 50 and 51 under 35 U.S.C. § 112 be withdrawn.

#### **Rejection under 35 U.S.C. § 102**

The rejection of claim 53 under 35 U.S.C. § 102(b) as anticipated by Chivukula (US Patent No. 6,066,581) is traversed.

As an initial matter, Applicants point out that claim 53 depends from claim 37. The Office has not shown and the reference does not indicate the description of a dielectric thin film with a relative dielectric constant greater than 10 *consisting essentially of* the components of claim 37.

In particular, Chivukula generally describes a *sol-gel* precursor mixture for forming a perovskite ferroelectric material and other various physical processes for forming the material, which is entirely different from the present claims and description. Specifically, as indicated in the description column 12, lines 12-38, the general method of the for preparing a ferroelectric thin film includes:

1. A sol-gel precursor solution is prepared from an inorganic metal salt which is dissolved in a solvent, preferably water, and is mixed with organo-metallic starting material dissolved in the same or a different solvent. When two or more inorganic salts and/or two or more organic solutions are present, mixing is done in a manner so as to avoid the formation of any precipitate;
2. The resulting sol-gel precursor solution is used to make a thin layer on the substrate by use of conventional spray coating, dip-coat or spin-cast methods;
3. The layer is optionally dried by heating to about 100°C, and then heated to 350-400°C for a time ranging from a few seconds to a few minutes, preferably by rapid thermal processing, to remove the volatile solvents and carbon, and to form a stress-free amorphous film containing the inorganic metal oxide constituents;
4. A rapid thermal annealing treatment, preferably in an oxygen containing atmosphere, in the form of a 100°C/sec ramp to above 450°C, typically above 500°C and 600-800°C if compatible with other process steps, which is then held for about 10 seconds to several minutes, to crystallize the films into the required crystallographic phase.

(Emphasis added).

By contrast, as described in the present specification, the resulting grains of the present claims are significantly different than those formed by physical deposition processes and sol-gel processes. For instance, the present specification at page 11, lines 1-13 indicates that a routine high resolution transmission electron microscope or high resolution scanning electron microscope study of a cross-section of a structure reveals the following:

- (1) The grain-size distribution, and whether it conforms to a Gaussian distribution of sizes or a log normal distribution characteristic of other physical deposition methods. The film structure for a film fabricated in accordance with the present invention has an anomalously narrow grain-size distribution (i.e., less than about 15% standard deviation) which conforms to a Gaussian distribution of sizes, and not the log normal distribution characteristic of other physical deposition methods.

(2) The characteristic undercutting grains (i.e., dramatic prior to annealing/sintering and still distinctive after) at the dielectric film-substrate interface looks significantly different from the more hemispherical particles formed by physical deposition processes and sol-gel processes, in which the particles conform much more closely to the substrate. The grains of the present invention may exhibit a characteristic near-spherical shape.

(Emphasis added).

The specification further describes several improvements and advantages to grains and a thin film resulting from the technique.

Further, as noted by the Office at paragraph 4, page 3 of the present Office Action, it is the “final product per which must be determined in a ‘product by process’ claim.” Clearly, in the present case, even if any process limitations have not been given consideration, the resulting product is still different.

Therefore, claim 53 is not anticipated by the reference. In addition, there is no suggestion, motivation, or apparent reason that the claim 53 or any of the other claims are obvious in view of the reference. In particular, there is no suggestion to remove the sol-gel process or other physical processes described in the reference to achieve the claimed invention. Accordingly, the rejection should be withdrawn.

### **Rejections under 35 U.S.C. § 103**

The rejection of claims 20, 24, 35, 37, 50, 51, 53, 54 and 55 under 35 U.S.C. § 103(a) as obvious over Leung (US 2002/0137260) in view of Matijev (US Patent No. 5,900,223); and the rejection of claim 54 under 35 U.S.C. § 103(a) as obvious over Leung (US 2002/0137260) in view of Matijev (US Patent No. 5,900,223), and further in view of Yokouchi (US Patent No. 5,143,637) are traversed for reasons of record.

As previously pointed out and acknowledged by the Office, there are several deficiencies regarding the above references when viewed in their entirety. Among other things, Leung does not describe, *inter alia*, any surfactant-coated nanoparticles, and Matijev does not describe surfactant coating (or relate to the matrix material infiltration Leung) that would result in the claimed dielectric thin film having the above-recited components. Further, Yokouchi relates to a low-viscosity magnetic fluid, in which one skilled in the art would not look to or rely on such a

disclosure to cure the deficiencies of any of the references. Therefore, it would not be obvious for one to selectively pick and choose from the descriptions of these reference to piece together the claimed invention, absent improper hindsight of the present specification.

Applicants also note that the Office repeatedly recites several statements of "criticality" at pages 5 to 8 of the present Office Action regarding certain features/components of the claimed invention. However, Applicants point out that the numerous advantages of all features/components are pointed throughout the present specification, as mentioned above, and discussed at page 11, lines 1-42 and shown in Figures 2-24.

Therefore, the present are clearly not obvious in view of the above-cited references, alone or in combination. Accordingly, withdrawal of the rejection is requested.

In view of the foregoing, consideration and allowance are respectfully solicited.

In the event the Examiner believes an interview might serve in any way to advance the prosecution of this application, the undersigned is available at the telephone number noted below.

Applicants believe no fee is due with this response. However, if any fees are due, please charge our Deposit Account No. 50-0510, under Order No. 20140-00343-US2 from which the undersigned is authorized to draw.

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Respectfully submitted,

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